

Method of controlling an arrangement of hardware components

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5 The invention relates to a method of controlling an arrangement of a plurality of hardware components, at least some of which are coupled to one another via signal leads, by means of a data processing unit and a computer program which is executed therein. The invention also relates to a data and signal processing device, such as notably a television set, a video recorder, a set top box or an audio apparatus with a plurality of hardware components, at least some of which are coupled to one another via signal leads, and also with a data processing unit which serves to control the hardware components and in which a computer program can be executed.

10 Contemporary electronic apparatus for different fields of application generally are based on an arrangement with a plurality of separate hardware components that are capable of exchanging signals via appropriate signal leads. Such hardware components are often controlled and coordinated by at least one data processing unit (microcomputer, microcontroller) which can access the hardware components via appropriate interfaces and in which a computer program is executed so as to execute the control tasks.

15 Examples of systems of this kind are notably television sets, video recorders, set top boxes (decoder unit for taking up the cable connection in an interactive multi-medial communication concept) or audio apparatus. The computer programs for controlling such apparatus are usually structured such that a special software driver is formed for each hardware component, said driver communicating on the one side with the respective
20 hardware component and on the other side with a higher ranking software module. This results in hierarchical software structures in which modules of a higher level control an increasing number of software components, and hence also hardware components, of lower ranking stages. A system thus structured is known, for example, from US 5,956,023 which relates to a medical apparatus for the automatic processing of blood and other fluids. The
25 control of this apparatus, taking place at a higher software level, is separated from the hardware components of the apparatus via an instrument manager. Information to and from the hardware components in such apparatus is transported vertically through the hierarchical system. This has the drawback that information that has been acquired in a first hardware component and is required by another hardware component must be transported through

software components at higher levels, in the worst case even of the highest level. This is the case even when the information is of no or hardly any significance to the higher levels (low-level information).

Another approach that is frequently followed consists in providing a layer of
5 "physical apparatus drivers" which directly control the hardware components and in providing on top of this layer a layer of "logic apparatus drivers" which each control a respective aspect of the hardware. This solution again has the drawback that even the simplest change in the linking of the hardware components necessitates non-trivial modifications in the control software. This additional work represents a significant problem
10 in fields such as the manufacture of TV sets where in the course of a year many different products are produced by different combinations of the same hardware components.

US 4,698,766 discloses an automated processing and manufacturing arrangement in which a plurality of computers control machines, tools, conveyer belts and storage devices. The control software for these computers is divided into various modules
15 that serve to execute elementary functions and process the signals of the connected hardware components at a higher level.

EP 0 271 945 B1 discloses a database system with a plurality of sub-systems that are capable of producing and/or processing different types of data. Information is exchanged between the sub-systems via interfaces which are coupled to a common bus as well as via the classification according to type of the data to be transferred. In the case of a communication each sub-system states the data type of the requested or presented
20 information and transmits or receives the appropriate information in response thereto. Consequently, the sub-system need not know the configuration of the overall system, and notably not the address of another sub-system wherefrom it requests information or whereto
25 it transmits information. Correct assignment of the information takes place instead via the data type that is stated at the same time.

It is an object of the present invention to provide a flexible method of controlling a plurality of hardware components and also a data and signal processing device with a plurality of hardware components that can be comparatively simply adapted to a
30 modification of the configuration of the hardware components.

This object is achieved by means of a method as claimed in claim 1 and by means of a data and signal processing device as claimed in claim 5. Advantageous embodiments are disclosed in the dependent claims.

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